With this article the present series of "Notes on Winter Insects" is brought to a close. In addition to the 18 species of Orthoptera, 64 of Hemiptera-Heteroptera and 286 of Coleoptera, of which especial mention has been made, numerous other forms were taken, the most of which are, as yet, unidentified.

Among them are some twenty or more species of Coleoptera; six of Diptera; twelve winged Hymenoptera, besides numerous species of ants (among the former being females of *Vespa arenaria* and *maculata* and several species of Bombus and Apis). Five butterflies were also found in hibernation, viz., *Danais archippus* Fab., *Grapta interrogationis* Fab., and *comma* Harr., *Pyrameis atalanta* Linn., and *Vanessa antiopa* Linn., the last most common, and on the wing on Jan. 21, 1894.

Numerous species of myriapods and a number of spiders were also taken and preserved in alcohol, but are not yet identified.

If, on account of repetition in giving the detail of places of hibernation, the notes have not been as interesting as they otherwise might have been, I trust that they will go to prove that many insects live as adults through the cold season, and that their places of hibernation are not difficult to find. An extended investigation, carried on through a series of years would undoubtedly show many additional species to hibernate in the perfect stage, and if laboratory investigations were made in conjunction — there might be a solution of one of the great entomological problems; viz. How can a living insect be frozen solid for weeks and yet retain vitality sufficient to fully recover and perpetuate its kind when the halcyon days of spring roll round once more?

LIFE HISTORY OF DEILEPHILA LINEATA.

BY CAROLINE G. SOULE, BROOKLINE, MASS.

The eggs were sent me by Dr. J. M. Schaffer, from Keokuk, Iowa. They were laid on July 4th and 5th., and were ovoid, small in proportion to those of other sphingid moths of the same size as this *D. lineata*, and yellow green, becoming bluer in a few days.

July 10th they hatched. The young larva was $\frac{5}{32}$ inch in length, pale green, with a short, smooth, caudal horn with two setae at the tip, which turned gray. The head was round, had many gray setae, and was held nearly horizontal. The first segment had a row of setae projecting over the head, and the setae of the body were dark enough to be noticed without a glass. The larvae were very active and restless, and dropped by a thread when disturbed. They did not eat their shells, and ate grape-leaves but sparingly.

On the second day some had a distinct brownish-red dorsal line from the now black caudal horn half-way to the head, giving a pinkish look to the posterior part of the body. A few had the first few segments decidedly pinkish and looked (without a glass) striped longitudinally, the stripes being the black setae, which were most numerous on the

head and anal segment. On the third day a whitish subdorsal line showed faintly, extending from head to horn. The head was like old ivory in color and the body was almost as *glassy* green as that of a young *Thyreus abbottii*.

June 18th.— *First moult.* Head round, bilobed, orange-brown, smooth and large. Body, ¼ inch long, slender, dark green, speckled with lighter green, and had a bilobed horny plate of lighter green on the dorsum of first segment. There was a faint yellow stigmatal line on first three segments, and a bright yellow subdorsal line from head to horn, in most cases, but some larvae had no yellow lines. Feet and props of lighter green. Horn lighter green at base, black and rough above. Some larvae had the anal shield orange-brown. Ate very little.

June 22d. *Second moult.* Larvae ½ inch long. Head large, round, bilobed, orange-brown, speckled with lighter. Body almost black, speckled with yellow-white. Subdorsal line of bright yellow, widening into a yellow patch on each segment. Stigmatal wavy line of bright yellow. Body tapered from the third segment to the head. Feet, props and anal shield orange-brown. Horn orange-brown at base, black and rough above. Gave woodbine, which they ate eagerly, leaving the grape for it.

June 27th.— *Third moult.* ⅞ inch long. Head round, large, bilobed, deep orange-brown, with white dots and many setae. Body black, with transverse lines of white dots, velvety black on the dorsum and between the segments. Subdorsal line of bright yellow, widening into a spot on each segment. Bright yellow stigmatal line wavy and broken. Feet and props orange-brown. Horn black, shining, rough, still ending in two setae. Anal shield black, speckled and edged with yellow-white, and looking very high above the props.

July 1st. *Fourth moult.* 1½ inches long. Head orange-brown, speckled with lighter, small, round. Body pale green, with black transverse lines from stigmatal line to dorsal band. Dorsal band velvety black, giving off a short band of black, on each side, between each two segments. Subdorsal and stigmatal lines yellow, the yellow dot of the former occurring in the short black band. Dorsal plate on first segment orange-brown, speckled with lighter, as were the anal props and shield. Feet and abdominal props orange-brown. Horn slender, rough, orange-brown at base, black above, ending in two tiny tubercles. Spiracles yellow-white, encircled with black. Venter paler, and mottled, as well as striated, with black. One larva had the head, dorsal plate, and anal props and shield, green speckled with orange, the body hardly striated with black, the yellow lines very pale and greenish, and on each segment an orange spot. The dorsal black band was very faint and divided by a dorsal line of green, but the short black bands were very velvety and deep in color. In this stage all the larvae had a habit of moving the caudal horn as a finger might be moved, not merely depressing it backwards. They were very active, dropped from the stems when disturbed, and jerked their heads from side to side like larvae of *T. abbottii*. The body still tapered from the third segment to the head.

July 5th. *Fifth moult.* 1⅞ inches long. Head, dorsal plate on first segment, anal props and shield orange-brown, speckled with lighter. Body mustard-yellow with short blue-black bands between the segments. Dorsal line very fine and yellow. Subdorsal and stigmatal lines yellow, broken, with a yellow dot on each segment. Feet, props, and horn orange brown, the horn longer in proportion, and rough. Spiracles orange, circled with black. The second form had the head, dorsal plate, anal props and shield green, dotted with lighter; feet, abdominal props, and horn dull, pale orange. Body green, with much less black striation; dorsal line broad, green, in a wide, but less black band. Subdorsal yellow line contracted into a yellow spot, enclosing an orange dot set in the short black band on each

segment, with a very faint yellowish trace between the spots. Stigmatal line faint and broken, with an orange spot under each spiracle. One specimen had no orange in the subdorsal line of spots. In this stage also they moved their horns like fingers or antennae. In every moult they ate their cast skins even to the horns. July 11th, the longest one was 3¾ inches, the shortest 3 inches in length. They stopped eating, chewed holes in the cloth over their tins, and were very restless, then grew quiet, and two days later, spun loose nets between leaves or between leaves and the tin.

July 16th. Pupated. Pupa 1⅞ inch long, slender, of a pale tan-color, slightly pitted on abdominal segments. The head was much prolonged, and the eyes were well defined. The tongue case was not raised. The anal point had two short hooks. On each side of the abdominal segment below the tip of the wing covers was a rough oval patch of a deeper tan-color than the pupa. In two cases the wing covers kept a greenish tinge. Aug. 11th.—♀ emerged between 1 and 2 P.M. Sept. 25th, ♂ emerged before 12 M. The others show no signs of emerging.